

**CLAIMS**

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What is claimed is:

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1. An apparatus for positioning a workpiece in a spindle of a machine tool and removing a workpiece therefrom, said spindle having an axis of rotation and said workpiece having a centerline extending between a first end surface and a second end surface, said apparatus comprising:

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a mechanism for grasping the workpiece in a position proximate said spindle whereby said centerline is coincident with said axis of rotation,

means to move said spindle relative to said workpiece in the direction of said axis of rotation whereby said workpiece is inserted into said spindle or removed from said spindle.

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2. The apparatus of claim 1 wherein said mechanism includes a first gripping means for gripping the workpiece at the intersection of the first end surface and the centerline.

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3. The apparatus of claim 2 wherein said first gripping means is located spaced from said spindle.

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4. The apparatus of claim 2 wherein said first gripping means is positionable between an engaged position and a disengaged position.

5. The apparatus of claim 1 wherein said mechanism includes a second gripping means for gripping the workpiece at the second end surface.

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6. The apparatus of claim 5 wherein the second end surface is gripped at the intersection of the second end surface and the centerline.

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7. The apparatus of claim 5 wherein said second gripping means is located within said spindle and is positionable therein.

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8. The apparatus of claim 1 wherein said machine tool comprises a machine for manufacturing gears.

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9. The apparatus of claim 1 wherein said workpiece is one of a gear or gear blank.

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10. The apparatus of claim 9 wherein said gear or gear blank comprises a pinion having a shank.

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11. The apparatus of claim 10 wherein the first end surface of said pinion is a front face having a center and the second end surface of said pinion is the end of said shank having a center, the front face center and the shank center defining the centerline.

12. A method of positioning a workpiece in a spindle of a machine tool, said spindle having an axis of rotation and said workpiece having a centerline extending between a first end surface and a second end surface, said method comprising:

5 grasping the workpiece proximate said spindle whereby said centerline is coincident with said axis of spindle rotation,

moving said spindle relative to said workpiece in the direction of said axis of rotation to insert said workpiece into said spindle.

10 13. The method of claim 12 wherein said workpiece includes a center on said first end surface and a center on said second end surface with the centerline extending between said centers, said grasping being at both of said centers.

15 14. The method of claim 12 further including removing said workpiece from said spindle, said removing comprising:

grasping the workpiece along the centerline, and

20 moving said spindle relative to said workpiece in the direction of said axis of rotation to remove said workpiece into said spindle.

25 15. A method of machining a gear workpiece comprising the steps of:

positioning a workpiece in a spindle of a machine tool, said spindle having an axis of rotation and said workpiece having a centerline extending between a first end surface and a second end surface, said method comprising:

30 grasping the workpiece proximate said spindle whereby said centerline is coincident with said axis of spindle rotation,

moving said spindle relative to said workpiece in the direction of said axis of rotation to insert said workpiece into said spindle,

machining said workpiece,

- 5 removing the machined workpiece from said spindle by grasping the workpiece along the centerline, and moving said spindle relative to said workpiece in the direction of said axis of rotation to remove said workpiece into said spindle.